

# Logging firm succession and retention

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## Abstract

A mail survey of logging firms operating in the North Central region of the United States was conducted to understand familial ties, short-term business longevity, and succession decisions from the perspectives of owners. The objectives of the study were to: 1) characterize owners of logging firms; 2) examine the presence of familial ties in logging firms; 3) determine the expectations regarding future generations taking over family logging businesses; 4) determine the likelihood of firms remaining in business; and 5) determine what factors influence the likelihood that firms will remain in business. Results show that logging firm owners are predominantly white males with an average age of 48 years and 25 years of experience in the logging industry. While many firms indicated that they would be in the logging business in the next 5 years, 23 percent indicated that they would not. Over three-quarters of responding firms had familial business ties and over half of those respondents felt that a family member taking over the business was very or somewhat likely. Positive factors influencing the likelihood of logging firms remaining in business were increasing timber volume harvested and level of increasing profit margins. Factors that negatively influenced the likelihood of firms remaining in business were decreasing profit margins, lack of significant contribution of logging firm to household income, attitudes about challenges facing the logging industry, and age.

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The fate of logging firms is gaining increasing importance as a significant proportion of loggers or logging firm owners are at or near retirement age (Greene et al. 2001, Rickenbach et al. 2003, Keefer et al. 2003, Egan 2004). Additionally, in some regions of the United States there are relatively few new logging firms entering the profession (Rickenbach et al. 2003). The retention of existing firms is uncertain as a study in the northeastern U.S. and Canadian border counties found that 50 percent of Maine loggers expected to be in business in 5 years while only 36 percent of the respondents in Canada agreed with this statement (Egan 2004).

Many logging firms are family businesses and when a family business owner reaches retirement age, the business can be terminated, sold, or succeeded (Malinen 2004). The idea of succession is vital to the survival of family firms (Stravrou 1999) yet many family firms do not survive beyond the first generation (Stravrou 1999, Ibrahim et al. 2001) and less than one-third of family firms survive into the second generation. Further, only 15 percent survive to the third generation (Ibrahim et al. 2001). Lack of adequate successional planning and discussions of family members' future career intentions were important for determination of whether succession of the business was achieved (Stavrou 1999, Malinen 2001).

Researchers have noted the importance of familial relations in the future of logging (Egan and Taggart 2004). For loggers surveyed in counties in Maine that border Quebec, a familial lineage of loggers was significant in predicting the likelihood of encouraging a son or daughter to become a logger (Taggart and Egan 2004). This would lead one to believe that the logging industry will likely be comprised of those with familial

ties. The future, however, is uncertain as only 11 percent of loggers in Maine's border counties with Quebec and 10 percent of Quebec loggers indicated that they would encourage offspring to become a logger, actually suggesting a shrinking population of loggers with familial associations (Egan and Taggart 2004). The studies reviewed for this paper suggest that the logging workforce will increasingly be made of those who haven't previously logged and those who have no familial attachments to the logging industry. Lack of prestige associated with the logging industry and the dangerousness and difficulty of the work may be factors that hinder recruitment (Egan 2002). But, for those who are in the profession of logging, many are proud of their occupation and were originally attracted to the logging field because of a desire to take care of the forest resource (Keefer et al. 2003).

The purpose of this study was to examine the future of individual logging firms in the North Central region of the United States and determine future expectations of owners of logging companies in terms of the fate of the business as it relates to family as well as a more general view of the likelihood of remaining in business. The research questions this study attempted to answer were:

1. What are the demographic characteristics of logging firm owners?

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2. To what extent are familial ties present in logging firms?
3. What are the future expectations of firms in terms of the likelihood of future generations taking over the business?
4. What is the likelihood of firms remaining in business in the short-term future?
5. What influences firm retention in the short-term future?

### Methodology

This study focused on the North Central region of the United States. The majority of timberland in this region is owned by non-industrial private landowners (62%), industrial landowners (33%), and public landowners (5%) (Shifley and Sullivan 2002). Utilization of wood harvested for products in the North Central region is 1.6 billion cubic feet annually, of which 31 percent is sawlogs, 31 percent is pulpwood, 22 percent is fuelwood, 12 percent is composites, 2 percent are other products, and 1 percent is veneer (Shifley and Sullivan 2002).

Demographic characteristics of logging firms and their owner were described using descriptive statistics. The presence of familial ties and future expectations of remaining in the logging business were examined with Chi-square analysis. To determine the relative importance of factors influencing the likelihood of remaining in business, logistic regression was used. Details regarding the survey instrument and survey methodology procedures are indicated below.

### Survey instrument

A 12-page survey was developed covering the topics of timber supply, nature of business, and demographics. The survey instrument was developed for this research collaboratively with academic and agency researchers from University of Wisconsin-Madison, Purdue University, and the U.S. Forest Service North Central Research Station in Evanston, Illinois. The survey questions on level of mechanization and equipment were adapted from Rickenbach and Steele (2005). The survey was not formally pretested but was reviewed by the research team described and externally with project partners in academia and industry. This survey was mailed to an extant list of 1,499 logging firms operating in Wisconsin, Michigan, and Indiana. Logging firms in the study were compiled from government and industry maintained databases of timber buyer and logger training lists. Although the database used in this study was comprehensive, there were likely some logging firms that do not appear on industry or agency maintained databases. The survey method utilized was a modified Tailored Design Method (Dillman 2000) with an initial survey mailing followed by a reminder postcard and two follow-up surveys that were sent to non-respondents. Six hundred and ninety-four surveys were returned. Due to the ineligibility of some respondents, however, the total number of usable surveys for the analysis was 652. The actual response rate was 43.5 percent, and the adjusted response rate was 48.5 percent. Due to item non-response and the eligibility skip patterns in the survey, the actual "n" will vary by analysis and is indicated in the data tables. Non-response bias was not assessed in this analysis.

### Concept measurement

The likelihood of a family member taking over the logging business was measured by a five-point likelihood scale and

familial ties was measured by a dichotomous variable. Family-run businesses were defined as: one in which the family plays a central role in the leadership and daily workings of the business and includes at least two family members. The 5-year outlook (short-term) of the likelihood of remaining in business was a dichotomous variable. Firms that indicated that they would not be in business in the next 5 years were invited to respond to an open-ended question and explain why. Responses to the open-ended question were coded into thematic categories based on the dominant theme. The coding was conducted by two different researchers to ensure increased reliability of the thematic categories that emerged from the data. Percentage contribution of the logging firm to yearly household income was measured by a four category variable (**Table 1**). Timber volume and profit margin change were coded as trichotomous variables (**Table 1**), and the respondents were asked to reflect upon the previous 5-year time period. Categories for profit margin and timber volume were: greatly increased, slightly increased, remained the same, slightly decreased, and greatly decreased. The variable was recoded to reflect either an increase (i.e., slightly increased and greatly increased were combined), decrease (i.e., slightly decreased and greatly decreased), or no change. The survey was conducted in the spring of 2004.

### Scale development

To measure respondent's 5-year outlook on the trends and challenges facing the logging industry, a series of 13 questions were asked on the survey relating to this topic (Appendix 1). Exploratory factor analysis using Principal Component Analysis (PCA) was used to determine the dimensionality of this 13 question scale in the survey using SPSS 12.0 (Appendix 1). Factors with eigenvalues greater than 1 were retained and Varimax with Kaiser normalization was used to rotate the matrix orthogonally. Two items (logging will stay much like it is and mill prices will increase) were omitted to maximize the scale's reliability (Cronbach's alpha). The 11 remaining items loaded onto four factors and explained 56 percent of variance in attitudes regarding the challenges and trends facing the logging industry outlook (Appendix 1). Cronbach's alpha reliability for the scale was 0.782 (Appendix 1). The statement "logging practices will be more regulated" is a multidimensional concept and loaded on Factor 1 and Factor 4 (Appendix 1). Removing this item would decrease Cronbach's alpha to 0.624, which would decrease the reliability of the scale, thus this item was retained in both factors.

### Data analysis

Descriptive statistics were used to characterize logging firm owners (research question 1). For research questions 2, 3, and 4, Chi-square analyses were conducted. A logistic regression was used to determine factors that influence the logging firm retention (research question 5). The dependent variable in the logistic regression analysis was a dichotomous variable representing the likelihood of remaining in business in the next 5 years (yes/no). The independent variables in the analysis were attitudes about challenges and trends in the logging industry, the significance of the logging firm in providing for household income, logging firm profit margins, logging firm harvest volume, and age of owner.

## Results

The following are demographic characteristics of the owners of logging businesses in the North Central region of the United States (**Table 1**). The average age of logging business owners according to survey results was 48 years with a range of 22 to 78 years of age. Forty percent of logging firm owners are 50 years of age or above, 42.5 percent are aged 38 to 49, and 17.4 percent are less than 38 years old. The vast majority of respondents were male (99%) and White (non-Hispanic) (98%). African-American and Native American respondents represented approximately 2 percent of logging company owners (**Table 1**).

Compared to census figures for the population of Indiana, respondents to the survey contained a higher percentage of males (49% statewide vs. 99% survey) and were slightly older (Indiana median age = 36.3 yr) and less racially diverse (Indiana population is White = 88.3%, Native American = 0.3%, Asian = 1.3%, African-American = 8.9%) (U.S. Census Bureau 2000). The average number of years in the logging industry was 25 with a range of 2 to 60 years. Responding logging firms owners reported being in business an average of 21 years with a range of 1 to 99 years of operation. Respondents were asked to indicate the proportion that logging contributes to their overall income. Fifty-six percent of the respondents stated that over 75 percent of their total household income is derived from their logging business, 21 percent indicated that logging contributed 51 to 75 percent of their household income, and 24 percent indicated that the contribution to household income was 50 percent or less.

Slightly over half (53%) of responding firms stated that their profit margins had decreased over the previous 5-year period while 23 percent reported an increase (**Table 1**). Profit margins remained relatively unchanged for 25 percent of firms. For harvest volume, 45 percent of firms reported an increase while 24 percent noted a decrease and for 30 percent of the firms there was no indicated difference over the 5-year period inquired about in the survey. For those firms that employed workers (47.7%), they had an average of 4.8 full-time workers (range of 0 to 33) and 0.8 part-time workers (range of 0 to 23) on their payroll.

Projections about future expectations of being in business in 5 years were primarily positive with 77 percent affirming an expectation to be in business in the short-term future and 23 percent stating that they do not expect to be in the logging business in 5 years (**Table 2**). For those firms that stated they would be out of the logging business in 5 years, the primary reasons stated were: age (23%), profitability issues (19%),

Table 1. — Characteristics of North Central region logging firms and their owners.

Characteristic	n	Percent or mean $\pm$ standard deviation
Race/ethnicity		
White	628	97.8%
Native American	11	1.70%
Asian	0	0.00%
African-American	1	0.16%
Other	2	0.31%
Gender		
Male	639	99.1%
Female	6	0.9%
Demographics		
Mean age (yr)	628	47.57 $\pm$ 10.7
Mean years in logging industry (yr)	627	25.26 $\pm$ 11.0
Mean years company in operation (yr)	627	21.10 $\pm$ 14.6
Employment of workers		
Do you employ workers? YES	304	47.7%
Do you employ workers? NO	333	52.3%
Logging firm contribution to household income		
1% to 25%	59	9.2%
26% to 50%	92	14.4%
51% to 75%	133	20.8%
More than 75%	355	55.6%
Profit margins		
Slight to great increase in profit margins over previous 5 years	143	22.6%
Profit margins remained the same over previous 5 years	157	24.8%
Slight to great decrease in profit margins over previous 5 years	334	52.7%
Harvest volume		
Slight to great increase in harvest volume over previous 5 years	299	46.1%
Harvest volume remained the same over previous 5 years	193	29.8%
Slight to great decrease in harvest volume over previous 5 years	156	24.1%

Table 2. — Chi-square analysis of respondent projections about future expectations of remaining in business.<sup>a</sup>

Conceptual variable	Survey question	Responses (n (%))	
Future expectations	Do you expect to be in the logging business in 5 years?	Observed	
		Yes	No
		474.0 (76.7%)	145.0 (23.3%)
		Expected	
		Yes	No
		309.5 (50.0%)	309.5 (50.0%)

<sup>a</sup> n = 619,  $\chi^2 = 176.97$ , df = 1,  $p < 0.001$ .

low mill prices paid for wood (9%), high stumpage prices (9%), workman's compensation too high (5%), stumpage availability (5%), another job (4%), health concerns (4%), other (3%), fuel costs (3%), too much hassle (3%), benefits are too low (2%), equipment prices (2%), competition too high (2%), small firm unable to compete against larger firms (2%), regulation/permits (1%), no heirs/heirs not interested (1%), employee availability (>1%), too many hours (>1%), and urbanization (>1%).

**Table 3. — Chi-square analysis of respondent projections about the existence of familial business ties and the likelihood of future generations taking over the logging firm.**

Conceptual variable	Survey question	Responses (n (%))				
Familial business ties	Is your company a family business? ( $n = 311$ , $X^2 = 91.84$ , $df = 1$ , $p < 0.001$ )	Observed				
		Yes	No			
		240.0 (77.2%)	71.0 (22.8%)			
		Expected				
Future generations	Will future generations (e.g., son, daughter, niece, nephew) of the owner's family take over the business? ( $n = 214$ , $X^2 = 27.57$ , $df = 3$ , $p < 0.001$ )	Yes	No			
		155.5 (50.0%)	155.5 (50.0%)			
				Observed		
		Very likely	Somewhat likely	Somewhat unlikely	Very unlikely	No heirs <sup>a</sup>
		32.2%	22.0%	11.7%	34.1%	>1.0%
				Expected		
		53.5 (20.0%)	53.5 (20%)	53.5 (20%)	53.5 (20%)	53.5 (20%)

<sup>a</sup> The “No heirs” response category was not included in the statistical analysis.

Many logging firms have familial business ties with 77 percent of respondents reporting that the company is a family business (**Table 3**). When asked about the likelihood of a future generation of the family taking over the family business, 32 percent stated that it was very likely to happen, 22 percent stated that it was somewhat likely to happen, 12 percent thought it was somewhat unlikely, and 34 percent believed that it was very unlikely (**Table 3**). Less than 1 percent of respondent stated that they had no heirs. The three Chi-square analyses conducted for research questions 2, 3, and 4 all held statistical significance at the  $p < 0.001$  level (**Tables 2 and 3**).

The likelihood of remaining in business in the short-term future model was significant at the  $p < 0.05$  level and had an adjusted  $r^2$  of 0.226 (**Table 4**). This model contained the following variables:

1. attitudes about challenges and trends in the logging industry,
2. the significance of the logging firm in providing for household income,
3. logging firm profit margins,
4. logging firm harvest volume, and
5. age.

Attitudes about the changing nature of the logging industry were significantly and negatively related to the likelihood of remaining in business over the short-term as was a small contribution of the logging firm to overall household income. That is, the probability of remaining in business decreases

**Table 4. — Logistic regression results for short-term longevity of logging firm.<sup>a, b</sup>**

Independent variables	Parameter estimate $\beta$	Standard error	$p$ -value
Logging industry attitudes			
Challenging business environment	−0.157	0.119	0.188
Increasing sprawl and development	0.106	0.115	0.355
Changing nature of logging industry	−0.318	0.119	0.008
More regulated business environment	0.202	0.113	0.072
Logging firm contribution to household income			
0 to 25%	−1.006	0.364	0.006
26% to 50%	−0.339	0.324	0.295
51% to 75%	0.208	0.335	0.535
More than 75%	Ref. <sup>c</sup>	Ref.	Ref.
Profit margins			
Increase in profit margins over previous 5 years	1.192	0.378	0.002
Profit margins remained same over previous 5 years	0.781	0.307	0.011
Decrease in profit margins over previous 5 years	Ref.	Ref.	Ref.
Harvest volume			
Increase in harvest volume over previous 5 years	0.701	0.294	0.017
Harvest volume remained the same over previous 5 years	0.479	0.303	0.114
Decrease in harvest volume over previous 5 years	Ref.	Ref.	Ref.
Demographics			
Age of owner	−0.043	0.011	>0.001

<sup>a</sup> Dependent variable: Do you expect to be in the logging business in 5 years? (Yes/No).

<sup>b</sup> Nagelkerke  $R^2 = 0.226$ ,  $df = 12$ ,  $p < 0.001$ .

<sup>c</sup> Ref. = Reference category.

as firm owners have weak attitudes about the changes facing the industry and the firm only contributes a small portion of household income. Attitudes about the effects of urban sprawl and development, increased regulation, and business challenges did not significantly influence the likelihood of remaining in business. Timber volume and profit margin increases as well as profit margins remaining level were associated with an increased likelihood of remaining in business over the short term. Lastly, the likelihood of remaining in business decreased with increasing age.



Appendix 1. — Rotated component matrix with factor loadings for Logging Industry Outlook Attitude Scale.<sup>a</sup> Bold indicates factor loadings over 0.40, contributing most to latent theme of the subscale.

Verbatim survey items <sup>b,c</sup>	Factor 1: Challenging business environment	Factor 2: Increasing sprawl and development	Factor 3: Changing nature of logging industry	Factor 4: More regulation, low-impact logging
Loggers will have to travel further for good logging chances	<b>0.630</b>	0.312	0.302	-0.092
Stumpage prices will increase	<b>0.826</b>	-0.015	0.064	-0.010
We will face greater competition from outside the United States	<b>0.508</b>	0.045	-0.003	0.387
There will be much less logging in my area because of urban sprawl	0.061	<b>0.702</b>	0.199	-0.120
More woodlots will be harvested for residential or commercial development	-0.077	<b>0.748</b>	-0.012	0.100
Logging parcels will be smaller	0.298	<b>0.622</b>	-0.138	0.164
There will be fewer but larger logging contractors	0.063	-0.050	<b>0.842</b>	0.051
There will be more subcontracting, with no employee	0.217	0.271	<b>0.417</b>	-0.162
Logging will be more mechanized	0.094	0.007	<b>0.694</b>	0.384
More “low impact” logging equipment will be used	-0.017	0.052	0.069	<b>0.837</b>
Logging practices will be more regulated	<b>0.428</b>	0.030	0.265	<b>0.434</b>

<sup>a</sup> Variance explained = 56.01%; Cronbach's alpha = 0.782.

<sup>b</sup> Survey question: Please think about what logging will look like in 5 years.

<sup>c</sup> Scale: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree.

## Discussion and conclusions

This research utilized data gathered from a regional survey of logging firms to examine familial ties and the factors that influence firm retention and firm succession. The firms in this study were mainly established firms with a long history of operation, experienced firm owners, and owners nearing retirement age. This is consistent with other studies that also report few young logging firm owners and established operations (Greene et al. 2001). Overall, the better the recent past and current experiences are for the respondent in relation to profitability and harvest volume, the more likely they are to remain in the business for the next 5 years. Age is an important influencing factor in remaining in business and as logging firm owners reach retirement age, many will be looking to family members to take over the company. But, while many firms (77%) indicated that their logging firm is a family business, 46 percent stated that it was somewhat to very unlikely that an heir would take over the family business. Also, while many firms (77%) indicated that they plan to remain in business in the short-term future, nearly one in four firms will likely go out of business. Results show that the likelihood of remaining in business can be negatively impacted by age, decreased contribution of logging to household income, and the belief that the changes occurring in the logging industry (mechanization, subcontracting employees, consolidation) are not significant issues.

This study and others have shown that succession is a critical issue facing family logging firms. Firm retention may be in jeopardy in part to successional issues and in part because of profitability issues. For the firms that were part of this study, however, attitudes about urban sprawl and development did not negatively influence the likelihood that a firm would remain in business. This was confirmed by the qualitative responses logging firms provided about why they would be leaving the business. Less than 1 percent indicated that it was due to urbanization and 5 percent indicated that it was due to lack of stumpage availability. This suggests that issues relating to urban sprawl are not felt universally by the logging firms in the North Central United States. Future research should determine if firm retention and succession trends hold for other regions of the United States as well as other regions of the world.

## Limitations

One limitation of the current study is that a non-response bias analysis was not conducted. While the survey had an acceptable response rate, the study would have been strengthened by determining whether there were any differences between respondents and non-respondents. Another limitation of the study was that the terms “greatly” and “slightly” were not defined when referring to profit margins and harvest volume on the survey. But, adjustments were made for this by not distinguishing between these variations but instead noting an increase or decrease, regardless of the relative magnitude.

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